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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/747,627	12/22/2000	Shinichiro Yamada	09792909-4734	1822

26263 7590 10/25/2002

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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/25/2002

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/747,627

Applicant(s)

YAMADA ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-7. The claims are newly rejected under 35 USC §103, as necessitated by amendment. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji et al (U.S. Patent 5,759,714) in view of Iijima et al (U.S. Patent 6,300,012).

The patent of Matsufuji et al. is directed to a nonaqueous lithium secondary battery (see abstract). The negative electrode comprises a mixture of a non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 12, line 13; col. 13, line 4 et seq.; the Example). The negative electrode mixture is hot-pressed to form a sheet (see col. 14, lines 47-54).

Matsufuji et al. do not expressly teach that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration "provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics." Accordingly, the artisan would be motivated to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the claimed range.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji et al. in view of Iijima et al. as applied to claim 4 above, in further view of Kato et al (U.S. Patent 6,150,055) and Beauchamp (U.S. Patent 4,228,228).

Matsufuji et al. further disclose in column 12, line 12 et seq. that the tin oxide is made by a crushing and classification process.

The reference does not expressly teach that the carbon material is also crushed and classified, or that both materials are crushed and classified in an inert gas atmosphere. The reference further does not teach that the hot-pressing is performed in an inert atmosphere.

Kato et al. also relates to nonaqueous lithium secondary batteries. In column 3, line 7 et seq., the reference teaches that a carbonaceous negative electrode is pulverized and classified.

Beauchamp discloses a lithium battery in column 4, line 11. In column 3, line 35 et seq., the reference teaches that “if highly reactive electrode materials are present, the preparation is carried in the absence of air and moisture, usually in a dry box under an inert atmosphere.”

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Kato et al. to perform pulverizing and classifying steps on the carbon material of Matsufuji et al. In column 3, line 12, Kato et al. teach that “pulverization prior to heat treatment is important.” Accordingly, the artisan would be motivated to carry out pulverization and subsequent classification steps during the processing of the carbon material of Matsufuji et al.

Furthermore, the artisan would be motivated to carry out all of the above pulverizing, classifying, and hot-pressing steps in an inert atmosphere. As noted above, Beauchamp states that “reactive” electrode materials must be processed in such an inert atmosphere. The artisan would recognize that the materials of Matsufuji et al. are indeed “reactive,” because they tend to undesirably adsorb water from the air. This is a known problem in the nonaqueous lithium battery art, and is recognized by Matsufuji et al. at column 14, line 41 et seq. Therefore, the artisan would be sufficiently motivated to perform the pulverizing and classifying steps of the carbon and non-carbon materials of Matsufuji et al., in addition to the hot-pressing of the negative electrode, in an inert atmosphere.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasunami (U.S. Patent 6,371,995) in view of Watanabe et al (U.S. Patent 6,083,644), in further view of Iijima et al.

Yasunami is generally directed to a nonaqueous lithium secondary battery. The negative electrode comprises a mixture of a lithium-occluding non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 19, lines 25-30), and the positive electrode comprises a lithium composite oxide. In the abstract, the reference teaches that the positive electrode sheet, negative electrode sheet, and separator are wound into a battery can, and electrolyte is injected (i.e., poured) into the can.

Yasunami does not expressly teach that the winding and pouring steps are performed in an inert or dry air atmosphere, or that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1.

Watanabe is generally directed to a nonaqueous lithium secondary battery. In column 14, lines 38-40, the reference teaches that the battery is assembled in a moisture-free or inert gas atmosphere.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the

disclosure of Iijima et al. to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration “provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics.” Accordingly, the artisan would be motivated to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the claimed range.

Additionally, the artisan would be motivated by the disclosure of Watanabe et al. to assemble (i.e., perform the winding and pouring steps) the battery of Yasunami in an inert gas atmosphere. In the cited passage, Watanabe et al. teaches that this is “desirable,” and further teaches that it is “preferred...from the point of cycle property” if the electrodes have a water content of less than 50 ppm. Accordingly, the artisan would be motivated to perform the winding and pouring steps of Yasunami in an inert gas atmosphere.

5. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniuchi et al (U.S. Patent 5,925,283) in view of Watanabe et al, in further view of Iijima et al.

Taniuchi et al. is generally directed to a nonaqueous lithium secondary battery. In Example 14, a method for making the negative electrode is taught, which comprises the steps of

mixing coke, binder and solvent by a roll mill in an inert atmosphere, and subsequently coating the slurry onto a copper current collector and drying it in the inert atmosphere. As disclosed in column 8, line 40, graphite may also be used as the active material.

Taniuchi et al. do not expressly teach that the negative electrode also comprises a non-carbon material, or that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1.

In column 15, lines 20-30, Watanabe et al. teach a negative electrode material comprising SiO, graphite, and a binder.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the negative electrode composition of Watanabe et al. in the negative electrode of Taniuchi et al. In the abstract, Watanabe et al. disclose that their battery has "high energy density, less inner resistance and excellent charge and discharge characteristics." The abstract further teaches that the battery "has high charge and discharge efficiency, does not cause defect[s] such as inner short-circuit due to formation of dendrite[s], and it is very stable with a long cycle life." Accordingly, the artisan would be motivated to use the negative electrode composition of

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Watanabe in the negative electrode of Taniuchi et al, and would therefore possess sufficient skill to perform the method of Taniuchi et al. using these materials.

Additionally, the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Taniuchi et al. which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration “provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics.” Accordingly, the artisan would be motivated to use an average particle size of the graphite of Taniuchi et al. which is larger than that of the non-carbon active material, thereby falling within the claimed range.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37


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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Patrick Ryan
Supervisory Patent Examiner
Art Unit Center 1700

JSC

October 21, 2002